Additionally, Claims 9 and 18 were amended to incorporate a number average molecular weight limitation for the polymer coating of 50,000 to 500,000. Support for the amendment may be found at page 9, lines 14-16 of the Specification.

Rejections under 35 USC § 103

Claims 1-5, 7-11 and 13-30 were rejected under 35 USC § 103(a) as being unpatentable over Yahiaoui et al., US 5,814,567, in view of Zeidell, US 3,902,299, as set forth previously. Yahiaoui et al. teach that the coated fabric may be used as a wipe. Zeidell teaches laundering wipes to remove unwanted lint and debris. The skilled artisan would have been motivated to launder the fabric of Yahiaoui et al. by the desire to remove lint and debris from the wipe. Further, the Examiner finds that the skilled artisan would have been motivated to launder the fabric sufficiently to achieve Applicants' particle release property by the desire to further reduce lint and debris, thereby allowing the wipe to be sold into markets where improved particle release properties are desired.

In response to Applicants' argument that the claimed invention provides unexpected benefits of particle attraction, the Examiner stated "the particle attraction would have been an obvious benefit of a coating on a fabric because the coating composition can be modified for tackiness."

For the following reasons, Applicants respectfully disagree with the Examiner's position.

Scope and Content of the Prior Art

Yahiaoui et al. is directed to disposable absorbent products, such as diapers, training pants, feminine care products, incontinent care products, surgical gowns, surgical drapes, wipes and the like. The object of Yahiaoui et al. is to treat a

hydrophobic substrate with a durable coating, which is wettable by water without significantly lowering the surface tension of an aqueous medium to which the coated substrate may be exposed. ('567 at col. 1, lines 44-48). The '567 reference lists numerous hydrophobic polymers that may be employed in the invention, but polyamides are not suggested.

Zeidell claims a process for laundering a wiping cloth made out of a synthetic material, wherein "the synthetic material is nylon." ('299 Claim 1). The laundering process removes lint and contaminants from the cloth. The steps of the Zeidell process comprise:

- Filtering the wash water through a 5 micron filter;
- Adding detergent to the heated, filtered wash water;
- Washing the cloths in the wash water at 175 °F for 10 minutes
- Rinsing the cloths in two 5 minute rinses, followed by two 2 minute rinses in hot water;
- Rinsing the cloths in cold water for 3 minutes;
- Rinsing the cloths in a second rinse in a cold, anti-static solution for 5 minutes;
- Rinsing the cloths in a third cold water rinse for 4 minutes and extracting the water;
- Drying the cloths in a cleanroom atmosphere; and
- Placing the cloths in a plastic container until ready for use.

Differences Between the Claimed Invention and the Prior Art

Applicants claim a textile fabric coated with a particle attracting polymer, and

which has a low particle release count. The textile fabric is particularly suited for use in cleanrooms, to remove particulate contaminants, and because of its low particle release count, does not introduce particulate contaminants to the cleanroom environment.

While Yahiaoui et al. disclose polymer coatings, such as those claimed by Applicants, Applicants have demonstrated that the textile fabrics of Yahiaoui et al. do not meet the particle release counts claimed in the present in invention. There is no suggestion in Yahiaoui et al. that the coated hydrophobic substrates have utility in cleanrooms, or other such environment requiring stringent particle release limitations. Likewise, there is no suggestion to launder the coated hydrophobic substrates to meet such stringent particle release limitations.

Zeidell does not suggest a coated fabric, particularly not a fabric coated with the claimed particle attracting polymer. Further, the focus of Zeidell is clearly on nylon, which is generally not considered to be an "hydrophobic polymer substrate." Nylon is not listed by Yahiaoui et al. as a hydrophobic polymer substrate, nor do they list any other polyamide.

The Examiner finds the motivation to launder the coated hydrophobic substrate of Yahiaoui et al. according to the process of Zeidell on the ground that the skilled person would have desired to remove lint and contaminants. The Examiner's argument has the following shortcomings.

1. Yahiaoui et al. do not suggest laundering the coated hydrophobic substrates to remove lint and contaminants. For example, lint is not a concern with regard to diapers.
2. Even if the skilled person were motivated to launder the substrates of Yahiaoui et al. to remove lint and contaminants, the skilled person would not have subjected the substrate to the meticulous and stringent process disclosed by

Zeidell. The type of lint and contaminants that may be of concern in the applications disclosed by Yahiaoui et al. can readily be removed using conventional washing processes, which are not intended to reduce the release of particles in the 0.5 to 5 micron range to cleanroom standards, such as Applicants claim.

3. The skilled person desiring to reduce lint and contaminants on a coated hydrophobic substrate would not look to Zeidell, since the process of Zeidell focused on nylon. The hydrophilic properties of polyamides are well documented in the scientific literature. (*Kirk-Othmer Encyclopeia of Chemical Technology,* 4th ed., Vol. 19, pp. 524-525 and 563-564; *Polymer Handbook* 4th ed., pp. V/121.)

The Examiner has failed to demonstrate a *prima facie* case of obviousness, because there is no motivation for the skilled person, who desires to launder the substrate of Yahiaoui et al., to select a "cleanroom" standard for laundering, over conventional laundering processes. The connection between the Yahiaoui et al. and Zeidell references can only be understood in hindsight, with the benefit of Applicants' disclosure.

Without question, there has been a long felt need for a cleanroom wiper, which not only has a very low particle release count, but improved contaminant pick-up. Applicants submit the following references for the Examiner's consideration and entry into the record: *Evaluating cleanroom wipers to establish performance benchmarks,* Micro, pp. 51-56 (May 1998); and *Full-Fab Surface Particle Detection Improves Yields,* Semiconductor International (June 1997). Applicants' claimed textile fabric meets the cleanroom particle release count standards, and has enhanced particle attraction to remove contaminants that are introduced into a cleanroom from other

sources.

Unexpected Advantages

It is well established that the unexpected advantages of an invention can rebut a *prima facie* case of obviousness. *In re Chupp*, 2 USPQ2d 1437 (CAFC 1987). A significant an unexpected advantage of the present invention is the particle attraction properties of the coating, especially in the critical range of 0.5 to 5 microns.

The Examiner dismissed such unexpected advantages because the particle attraction would have been an obvious, since the coating composition can be modified for tackiness. The Examiner's argument cannot be sustained for the following reasons.

Implicit in the Examiner's argument is that the cited references are modified by a third, undisclosed reference, related to tack cloths. Yahiaoui et al. do not teach that the coating should be modified to create tackiness. In fact, if one considers a diaper or feminine care product having a tacky finish, one quickly realizes that the utility of the coated hydrophobic substrate of Yahiaoui et al. would be lost by the modification suggested by the Examiner.

Further, the Examiner has not provided any basis for the assertion that it would have been obvious to modify the coating of Yahiaoui et al. to make the coating tacky. Why would the skilled person consider the coated hydrophobic substrate of Yahiaoui et al., if that person really wanted a tack cloth? How would the skilled person know how to modify the coated hydrophilic substrate of Yahiaoui et al. to provide "tackiness", since the reference contains no such guidance?

Finally, the Examiner has failed to demonstrate why a tack cloth would be subjected to laundering according to the process of Zeidell or that a tack cloth would have utility in cleanroom, without leaving a sticky residue on surfaces.

The unexpected advantages of the claimed invention must be considered in terms of

the invention's utility, i.e. a wiper for removing particulates in cleanrooms. At the time the invention was made, there was no expectation of success, because:

- The stringent particle release standards of a cleanroom wiper motivated the skilled person to remove all sources of contamination from the surface of the wiper. It is counter-intuitive to add a polymer coating to the wiper, since the coating can flake-off.
- The skilled person did not recognize that a polymer coating applied to the wiper would improve particle pick-up.
- The wipers are subjected to a rigorous cleanroom laundering, and there was no expectation that a particle attracting polymer coating could survive the laundering process.
- Coating the wiper with a particle attracting polymer may have had the undesirable consequence of making it more difficult to meet the particle release count standards of cleanrooms, because of the difficulty of removing contaminants from the wiper during the laundering process.

Claims 21-33 [sic] were rejected under 35 USC § 103(a) as being unpatentable over Yahiaoui et al. in view of Zeidell, and Applicants admitted prior art (AAPA) as previously set forth.

Applicants rely upon the arguments set forth above with regard to (i) the lack of a *prima facie* case having been established; and (ii) the unexpected advantages of the present invention.

Applicants further note that Claims 6 and 12 are pending in the application and have not been addressed by the most recent Office action. Additionally, Applicants

note that there are only 31 pending claims.

Applicants would like to thank the Examiner for the interview of July 25, 2002 at the USPTO. Applicants confirm that at the time of the interview, Applicants provided the Examiner with a copy of an excerpt from *Encyclopedia of Cleanrooms, Bio-cleanrooms and Aseptic Areas,* Chapter 36, pp. 690-699 (Contamination Control Seminars 1995), as background information on cleanroom laundries.

Applicants submit that the application is in condition for allowance and respectfully request the same.

Respectfully requested,

February 6, 2003

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to The Commissioner of Patents and Trademarks, Washington, DC 20231, on February 6, 2003, along with a postcard receipt.

Timothy J. Monahan
Attorney for Applicant(s)

Appendix A

What we claim is:

1. (Currently amended) An article comprising a textile fabric selected from the group consisting of woven, knitted, wet laid, dry laid and needle punched fabric, and a particle attracting polymer coated on the fabric, the article having a particle attraction coefficient of 50% or greater for one or more of the types of particles selected from the group consisting of carbon black, copper, copper oxide, silicon, silicon oxide, tungsten and tungsten oxide particles, and a particle release count of particles greater than 0.5 microns of 75 million particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2.

2. (Original) The article of Claim 1 having 0.01 to 6 weight % of polymer relative to the weight of the fabric.

3. (Previously amended) The article of Claim 1 wherein the fabric is woven or knitted from polyester fiber and has a weight of from 2 to 9 ounces per square yard.

4. (Original) The article of Claim 1 having a particle attraction coefficient of 100% or greater for carbon black.

5. (Previously amended) The article of Claim 1 wherein the polymer has a number average molecular weight of 25,000 to 1,000,000 and the polymer has a plurality of pendant groups selected from the group consisting of hydroxy, hydroxyalkyl and carboxy groups.

6. (Original) The article of Claim 1 wherein the article is saturated with a solvent and packaged in a sealed container.

B2

7. (Currently amended) The article of Claim 1 having a particle release count of particles greater than 0.5 microns of 30 million particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2 and an extrinsic sorbency of 3.5 milliliters/meter squared or greater as measured by IEST-RP-CC004.2.

B2

8. (Currently amended) An article comprising a textile fabric and a particle attracting, water-soluble polymer coated on the fabric, wherein the polymer is selected from the group consisting of:

(i) polysaccharides having a plurality of pendant groups selected from hydroxy, hydroxyalkyl and carboxy groups; and

(ii) polymers formed by vinyl polymerization, having a plurality of pendent groups selected from hydroxy, hydroxyalkyl, carboxy, amino and alkylamino groups;

wherein the article has a particle attraction coefficient of 50% or greater for carbon black, and a particle release count of particles greater than 0.5 microns of 30 million particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2.

9. (Currently amended) The article of Claim 8 wherein the polymer has an average molecular weight of ~~25,000 to 1,000,000~~ 50,000 to 500,000.

10. (Previously amended) The article of Claim 9 having 0.02 to 3 weight % of polymer relative to the weight of the fabric, and the fabric has a weight of 2 to 9 ounces per square yard.

11. (Original) The article of Claim 9 wherein the polymer is selected from the group consisting of cellulose ethers, poly(vinyl alcohol) and vinyl alcohol copolymers.

12. (Original) The article of Claim 11 wherein the article is saturated with a solvent and packaged in a sealed container.

13. (Currently amended) The article of Claim 11 having a particle attraction coefficient of 100% or greater for carbon black and a particle release count of particles greater than 5 microns of 300,000 particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2.

B4

14. (Currently amended) A wiper comprising a woven or knitted textile fabric and a particle attracting polymer coated on the fabric, wherein the polymer is selected from the group consisting of (i) cellulose ethers; (ii) inorganic cellulose esters; (iii) chitosan; (iv) guar gums and hydroxy, hydroxyalkyl and carboxy substituted derivatives thereof; (v) starch and hydroxy, hydroxyalkyl and carboxy substituted derivatives thereof; (vi) poly(vinyl alcohol) and vinyl alcohol copolymers; (vii) poly(vinyl pyrrolidone); (viii) poly(hydroxyalkyl acrylate) and poly(hydroxyalkyl methacrylate) and (ix) poly(alkyl acrylamide) and poly(alkyl acrylamide) copolymers;

wherein the article has a particle release count of particles greater than 0.5 microns of 75 million particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2.

15. (Original) The wiper of Claim 14 having 0.05 to 1 weight % of polymer relative to the weight of the fabric.

16. (Original) The wiper of Claim 14 having a particle attraction ratio of 100% or greater for carbon black.

B5

17. (Previously amended) The wiper of Claim 16 wherein the fabric constructed from polyester yarn having a denier of 15 to 250 and the fabric has a weight of from 2 to 9 ounces per square yard.

B6

18. (Currently amended) The wiper of Claim 14 the polymer is selected from the group consisting of cellulose ethers, poly(vinyl alcohol) and vinyl alcohol copolymers having a number average molecular weight of 50,000 to 500,000.

19. (Original) The wiper of Claim 18 having from 0.02 to 3 weight % of polymer relative to the weight of the fabric and a particle attraction ratio of 50% or greater for carbon black.

B7

20. (Currently amended) The wiper of Claim 19 having a particle release count of particles greater than 5 microns of 300,000 particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2 and an extrinsic sorbency of 3.5 milliliters/meter squared or greater as measured by IEST-RP-CC004.2.

21. (Original) The wiper of Claim 14 wherein the article further comprises a surfactant residue in the range of 0.1 ppm to 0.5 wt.%.

22. (Original) The article of Claim 1 wherein the article further comprises a surfactant residue selected from the group consisting of anionic and nonionic surfactants, in the range of 0.5 ppm to 0.1 wt.%.

23. (Original) The article of Claim 8, wherein the article further comprises a surfactant residue in the range of 0.1 ppm to 0.5 wt.%.

B8

24. (Currently amended) An article comprising a textile fabric and a particle attracting polymer coated on the fabric, the article having a particle attraction coefficient of 50% or greater for one or more of the types of particles selected from the group consisting of carbon black, copper, copper oxide, silicon, silicon oxide, tungsten and tungsten oxide particles, and a particle release count of particles greater than 5 microns of 300,000 particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2, and the article is packaged in a sealed container and has

B8 Cont'd

not been laundered subsequent to the particle attracting polymer having been coated on the fabric.

25. (Original) The article of Claim 24 having a particle attraction coefficient of 100% or greater for carbon black.

26. (Previously amended) The article of Claim 24 wherein the polymer has a number average molecular weight of 25,000 to 1,000,000 and the polymer has a plurality of pendant groups selected from the group consisting of hydroxy, hydroxyalkyl and carboxy groups, and the fabric has a weight of 2 to 9 ounces per square yard.

B9

27. (Currently amended) The article of Claim 24 wherein the article has a particle release count of particles greater than 0.5 microns of 30 million particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2.

28. (Previously amended) The article of Claim 27 wherein the particle attracting polymer is water-soluble and is selected from the group consisting of:

(i) polysaccharides having a plurality of pendant groups selected from hydroxy, hydroxyalkyl and carboxy groups; and

(ii) polymers formed by vinyl polymerization, having a plurality of pendant groups selected from hydroxy, hydroxyalkyl, carboxy, amino and alkylamino groups.

B10

29. (Currently amended) The article of Claim 24 wherein the article has a particle release count of particles greater than 5 microns of 150,000 particles per square meter or less as measured by Biaxial Shake Test IEST-RP-CP-CC004.2.

30. (Original) The article of Claim 29 wherein the particle attracting polymer is selected from the group consisting of (i) cellulose ethers; (ii) inorganic cellulose esters; (iii) chitosan; (iv) guar gums and hydroxy, hydroxyalkyl and carboxy substituted derivatives thereof; (v) starch and hydroxy, hydroxyalkyl and carboxy substituted

derivatives thereof; (vi) poly(vinyl alcohol) and vinyl alcohol copolymers; (vii) poly(vinyl pyrrolidone); (viii) poly(hydroxyalkyl acrylate) and poly(hydroxyalkyl methacrylate) and (ix) poly(alkyl acrylamide) and poly(alkyl acrylamide) copolymers.

31. (Original) The article of Claim 24 wherein the article is saturated with a solvent and packaged in a sealed container.